

EXHIBIT 9

**Excerpts of Revised Feasibility Study served by Plaintiffs' expert
Anthony Brown**

**A complete copy of the Brown Reports is available upon the
request of the Court**



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REVISED FEASIBILITY STUDY

Master File No. 1:00-1898, MDL No. 1358 (SAS), M21-88, No. 08 Civ. 00312
New Jersey MTBE Litigation

Prepared on behalf of:

New Jersey Department of Environmental Protection (NJDEP)
The Commissioner of the NJDEP
The Administrator of the New Jersey Spill Compensation Fund

For:

The Office of the Attorney General of New Jersey
and

Miller, Axline & Sawyer
The Law Office of John K. Dema
Berger & Montague
Cohn Lifland Pearlman Herrmann & Knopf

Project No.: 003-01

January 2013



4.0 SCREENING OF ALTERNATIVES

4.1 Effectiveness

Effectiveness includes both short-term and long-term effectiveness and reductions in toxicity, mobility, or volume. The short-term is considered to be the remediation construction and implementation period. Long-term begins once the remedial action objectives have been met (USEPA 1989).

4.1.1 No Action

The No Action alternative includes no institutional controls, no treatment of soil, and no monitoring. This alternative is required for comparison. MTBE and TBA would continue to migrate off-site unchecked further impacting groundwater resources and only increasing the threat contamination poses to drinking water supplies, surface waters, and ecological habitats. This alternative is not effective in the short-term and is not effective in the long-term in reducing toxicity, mobility, or volume. For screening purposes the effectiveness of this alternative is low for all plaintiffs' trial sites.

4.1.2 Monitored Natural Attenuation

MNA includes long-term monitoring to document the natural attenuation of MTBE and TBA. The natural attenuation processes (dispersion; dilution; sorption; volatilization; radioactive decay; and chemical or biological stabilization) are relied upon to reduce MTBE and TBA toxicity, mobility, or volume in a reasonable period of time. While dispersion and dilution of the groundwater contaminant plumes are occurring as the plume migrates, significant concentrations are still detected some distance from the source at most plaintiffs' trial sites.

The K_{oc} for MTBE and TBA are low suggesting sorption will not significantly attenuate or retard the contaminant plumes. Given their low Henry's Law Constant, MTBE and TBA are not expected to significantly volatilize from the dissolved phase in groundwater to soil.

While biodegradation of MTBE can occur, and is often assumed to occur by responsible parties, rarely is actual site data collected over time to support this assumption (e.g. bacterial populations, dissolved oxygen content, nutrient concentrations, presence and concentration of intermediate and end products). It is also often reported that declining MTBE concentrations at monitoring wells suggests that biodegradation is addressing the contamination; however, rarely are corresponding increases in TBA concentrations observed. In addition, benzene is often still present and, in general, biodegradation of benzene precedes MTBE. Therefore, declining MTBE



concentrations (and corresponding declines in TBA concentrations) are most likely the result of migration of contaminants away from the well.

There is little actual evidence at the plaintiffs' trial sites that biodegradation is occurring. Therefore, for most plaintiffs' trial sites, this alternative is not effective in the short-term and is not effective in the long-term, and for screening purposes the effectiveness of this alternative is low. However, at two plaintiffs' trial sites (#11346 Shell; #4476 Valero), the current off-site contaminant concentrations in groundwater do not justify implementation of an active remediation system. Additional investigation proposed at these sites may indicate that off-site remediation of groundwater contamination is required. However, until such time, the MNA alternative is effective in the short-term, and may be effective in the long-term, at these two sites. For screening purposes, the effectiveness of this alternative is medium at these two sites.

4.1.3 Enhanced Biodegradation

Where there is no evidence that natural attenuation is taking place in a "reasonable" amount of time, significant amendments would be required for enhanced biodegradation to be effective. The key to this alternative's success is the engineered delivery of the amendments to the plume. Aboveground structures such as buildings and below ground structures such as utilities typically restrict access by engineered delivery systems. In addition, it is rare that amendments can be delivered to completely cover the plume; therefore, some sort of flow through barrier would have to be used with reliance on groundwater flow to reduce MTBE and TBA toxicity, mobility, or volume in the plume.

Given the complexity of groundwater flow conditions in the bedrock aquifers beneath many of the plaintiffs' trial sites (i.e. flow along fractures and other secondary porosity features acting as preferential pathways), delivery of amendments to the contaminant plume will be extremely difficult. In addition, monitoring of the systems' performance will also be difficult.

For those plaintiffs' trial sites where discharge of high concentrations of contaminants to a surface water body is occurring (e.g. #10792 Maple Shade Citgo, #15442 5-Points BP), it is unlikely that enhanced biodegradation would prevent continued discharge of contaminants.

In order for this alternative to be effective, a strong understanding of hydraulic conditions within the plume, and the chemical and biologic condition of the plume, must be known. At present, significant characterization data-gaps exist at all of the plaintiffs' trial sites.

Therefore, given the presence of contamination in bedrock aquifers at many sites, discharge to surface water at some sites, and the data-gaps at all plaintiffs' trial sites, this option may not be

EXHIBIT 10

Excerpts of Expert Rebuttal Report of Anthony Brown

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REBUTTAL REPORT OF ANTHONY BROWN

To Site Specific Expert Report of Virginia King

Prepared on behalf of:

New Jersey Department of Environmental Protection (NJDEP)

The Commissioner of the NJDEP

The Administrator of the New Jersey Spill Compensation Fund

For:

The Office of the Attorney General of New Jersey

and

Miller, Axline & Sawyer

The Law Office of John K. Dema

Berger & Montague

Cohn Lifland Pearlman Herrmann & Knopf

Project No.: 003-04

March 2013



Rebuttal Report of Anthony Brown
To Expert Report of Virginia King
March 2013

- I. Scope and Purpose
- II. Qualifications
- III. Information Considered
- IV. Summary of Opinions
- V. Basis of Opinions

Opinion 1:

Lack of Uniformity

Inconsistent Calculation of Damages

No Connection of Injury of Damages

Opinion

"...as demonstrated by Thomas Gillespie, many contaminants with varying degrees of toxicity have been detected in groundwater underlying the Ridgewood site" (King, 2013: pg. 6).

Rebuttal

It is recognized that the groundwater may be contaminated with other chemicals (e.g. PCE). However, this does not negate the defendants' responsibility to address the contamination they released. The NJDEP is requiring that the defendants address their contamination and restore groundwater to its condition prior to the discharge of MTBE and/or TBA. Based upon site-specific conditions, the NJDEP may elect to pursue other parties that caused the contamination by other chemicals (e.g. dry cleaners).

The NJDEP is requiring that the groundwater contamination be restored to its pre-discharge condition according to the New Jersey Spill Act (N.J.S.A. 58:10-23.11 et seq.), and to maintain the quality of the State's groundwater according to New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq).

Internal Inconsistencies

Opinion 2:

Kevin Boyle's damage assessment is wholly unnecessary and unreliably calculated.

Robert Unsworth's NRD calculations are based on faulty assumptions and are inappropriately calculated.

Opinion

"...Mr. Unsworth ignores the presence of hazardous substances other than MTBE, even where, such as at Ridgewood, non-MTBE hazardous substances are present at concentrations that exceed the applicable NJ GWQS" (King, 2013: pg. 11).



Rebuttal Report of Anthony Brown
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Rebuttal

It is recognized that the groundwater may be contaminated with other chemicals (e.g. PCE). However, this does not negate the defendants' responsibility to address the contamination they released. The NJDEP is requiring that the defendants address their contamination and restore groundwater to its condition prior to the discharge of MTBE and/or TBA. Based upon site-specific conditions, the NJDEP may elect to pursue other parties that caused the contamination by other chemicals (e.g. dry cleaners).

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Opinion 3:

No response.



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REBUTTAL REPORT OF ANTHONY BROWN

To Expert Report of William H. Desvousges, Ph.D.

Prepared on behalf of:

New Jersey Department of Environmental Protection (NJDEP)

The Commissioner of the NJDEP

The Administrator of the New Jersey Spill Compensation Fund

For:

The Office of the Attorney General of New Jersey

and

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1. SITE-SPECIFIC DAMAGE ASSESSMENTS

1.1. Livingston Trial Site

Statement

"The only contaminants detected above GWQS in PWS 11 are VOCs, primarily TCE and PCE" (Desvousges, 2013: pg. 80).

Rebuttal to Statement

MTBE has been detected at maximum of 28.7 (November 19, 2009) in PWS#11 (Aquilologic, 2013: B5, Table 1). However, since no pre-treatment (influent) groundwater samples have been analyzed since 2004. The concentration in the influent groundwater must have been higher than that of the effluent samples indicating that a significant source of MTBE impacted groundwater.

It is recognized that the groundwater may be contaminated with other chemicals (e.g. TCE and PCE). However, this does not negate the defendants' responsibility to address the contamination they released. The NJDEP is requiring that the defendants address their contamination and restore groundwater to its condition prior to impact by MTBE and/or TBA. Based upon site-specific conditions, the NJDEP may elect to pursue other parties that caused the contamination by other chemicals (e.g. dry cleaners).

The NJDEP is requiring that the groundwater contamination be restored to its pre-discharge condition according to the New Jersey Spill Act (N.J.S.A. 58:10-23.11 et seq.), and to maintain the quality of the State's groundwater according to New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq).

1.2. Deptford Trial Site

1.2.1. Assessment of Potential Service Losses

1.2.1.1. Potential Receptors

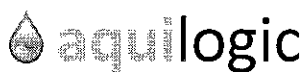
Statement

"The Deptford 2007 Master Plan indicates that the use of domestic wells in Deptford Township is 'limited and declining' because the Deptford Municipal utilities Authority extends water mains to reach undeveloped portions of the township (Slaugh 2007). Moreover, potable wells are not used in the area due to taste, odor, and staining issues related to the high iron content in the groundwater..." (Desvousges, 2013: pg. 90).

Rebuttal to Statement

According to 5 Points BP Site documents, Deptford Township was in the process of installing municipal supply test wells at the property adjacent to the Tortorice property when they learned of the adjacent

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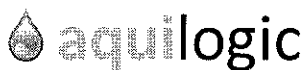
Rebuttal Report of Anthony Brown
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contamination (NJDEP-SITE595-007092). Two wells were installed, Site B and Site E. The Site E well was located "500 feet from the site [ARFA], and next to a well that has already been impacted [T-1]" (NJDEP-SITE595-007093). The Site E well was installed from "125 to 200 feet deep" (NJDEP-SITE595-007093). Upon learning of the adjacent contamination, "Deptford Township was disturbed by this information and requested copies of the file" (NJDEP-SITE595-007093). In the January 2000 Remedial Progress Report, Kluk consultants provides captioned photographs of the Site E well. One caption reads "The well is screened to test Mount Laurel; Wenonah, Marshalltown and Englishtown at depths between 100 and 250 feet. Scheduled testing was canceled (sic). The location is about 400 feet west of contamination in the Tortorice (Englishtown Formation) well (March 99)" (NJDEP-SITE595-005975). Thus, although no drinking water well other than T-1 has been impacted from releases at the facility, the releases from the facility prevented the utilization of municipal supply test wells that could have added additional groundwater supply to the public drinking water system. No further information regarding these wells was available.

It is recognized that the groundwater at the 5 Points BP Deptford Site contains high iron content which may impact the odor and taste of the drinking water. However, this does not negate the defendants' responsibility to address the contamination they released. The NJDEP is requiring that the defendants address their contamination and restore groundwater to its condition prior to the discharge of MTBE and/or TBA. If the background groundwater condition includes, for example, high iron content, then the defendants are not required to improve the natural quality of the water. Based upon site-specific needs, even groundwater of naturally poor quality (e.g. high TDS) may still be used for local, domestic supply. In addition, the shallow groundwater does move – laterally and vertically; and thus, recharges deeper groundwater that is of better general quality and use for public supply.

The NJDEP is requiring that the groundwater contamination be restored to its pre-discharge condition according to the New Jersey Spill Act (N.J.S.A. 58:10-23.11 et seq.), and to maintain the quality of the State's groundwater according to New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq).

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1.3. Manalapan Trial Site

1.3.1. *Assessment of Potential Service Losses*

1.3.1.1. Potential Receptors

1.3.1.2. Public Water Supply

Opinion

"...the groundwater zones that have been affected at the Manalapan Trial Site are not practical sources of water supply because they are low yielding. Its low yield was evidenced by the failure to get adequate volumes of water when conducting sample punches in 2012..." (Desvousges, 2013: pg. 96).

Rebuttal to Opinion

Soils below the Valero Site and to the southeast are generally described as fine-to medium grained sands and silts (Aquillogic, 2013: B7, Figure 5). Mr. Brown and Mr. Maguire (Maguire, 2013: pg. 10) conclude that this site is directly underlain by the Mount Laurel Formation. This formation constitutes an aquifer used widely as a source of water supply. Releases at the Valero Manalapan Site have contaminated groundwater in the Mount Laurel Formation. Numerous domestic and non-community WSWs are completed in the Mount Laurel Formation in the vicinity of the Valero Manalapan Site. While pumping rates at these nearby WSWs are not known, there is no evidence that groundwater yields at these wells are low. Given the number of WSWs in this formation, and based on regional hydrogeology and groundwater production data, it appears that groundwater yields are of acceptable volume.

The basis of the statement indicating low yield during the 2012 sampling is unknown. Sampling conducted in October 2012 did not encounter any problems collecting groundwater (Aquillogic, 2013: F2). There is no history of low groundwater yields in the sampling history of the monitoring wells at the Valero Site (Aquillogic, 2013: B7, Table 2).

Regardless of the groundwater yield, the defendant has an obligation to restore groundwater to its pre-discharge condition and is supported by the regulations, which define injury as *"any adverse change or impact of a discharge on a natural resource or impairment of a natural resource service, whether direct or indirect, long term or short term, and includes the partial or complete destruction or loss of the natural resource"*. Therefore, the plaintiffs are entitled to have the groundwater restored to its pre-discharge, non-injured state.

Further, under the New Jersey Spill Act (N.J.S.A. 58:10-23.11 et seq.), plaintiffs have the right to recover (amongst other things) *"cleanup and removal costs, damages (including primary and compensatory restoration damages and the costs of any natural resource damage assessments) and injunctive relief, for injury to, destruction of, or loss of natural resources."*

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In addition, the policy to maintain the quality of the State's groundwater is also supported by the legislature's declaration in the New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq), which states, *"It is the policy of this State to restore, enhance and maintain the chemical, physical, and biological integrity of its waters, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial and other uses of water."*

1.3.2. Service Loss Conclusions

1.4. West Windsor Trial Site

1.4.1. Assessment of Potential Service Losses

1.4.1.1. Potential Receptors

1.4.1.2. Public Water Supply

Opinion

"Groundwater at the West Windsor Trial Site would not be a viable source of water supply because it is low yielding and the baseline water quality levels are poor...The overlying bedrock and deposits are of low hydraulic conductivity and not a practical source of domestic water supply...In addition, there are high background levels of zinc and arsenic in the groundwater. In fact, in October 2011, the groundwater extraction system at the site was shut down due to the presence of zinc and arsenic in the treatment system discharge...Likewise, zinc, above permit discharge limits, has been reported in the groundwater recovery system influent, which has prevented the startup of the groundwater extraction system..." (Desvousges, 2013: pg. 98).

Rebuttal

The depth and hydrogeologic character of "competent" bedrock has not been established beneath the West Windsor Getty Site. Only one monitoring well (MW-6) encountered competent bedrock (from approximately 46 to 61 feet bgs). MTBE was detected in this well at concentrations up to 1,010,000ug/L (March 1, 2005). The recently installed deep monitoring well (MW-21D), completed to 50 feet bgs, did not encounter competent bedrock (GPMI_NJ_02488 – GPMI_NJ_02489).

There has only been one pumping test performed on-site to assess the hydraulic conductivity in the shallow sediments (including unconsolidated sediments and weathered bedrock). Additional assessment is needed to determine the groundwater yield in the shallow sediments, as well as to hydrogeologic character of the underlying bedrock.

Getty made no attempt to determine the background concentrations of dissolved metals in groundwater before the treatment system began operation. The origin of the elevated zinc and arsenic concentrations in the treatment system discharge is unknown. No regional data, or data from

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monitoring wells in the vicinity of the West Windsor Getty Site, has been presented to characterize background zinc and arsenic concentrations in local groundwater.

The full vertical and lateral extent of groundwater contamination at the West Windsor Getty Site is unknown, particularly in the bedrock. Therefore, it is premature to conclude that groundwater contamination is restricted to unconsolidated sediments and that deeper groundwater zones are not contaminated, until further investigation is conducted. There have been no additional pumping tests or groundwater modeling of the unconsolidated sediments to conclude that groundwater yields are limited. Insufficient data has been presented to characterize the background dissolved metal concentrations in local groundwater prior to the treatment system becoming operational. Therefore, the source of the elevated zinc and arsenic concentrations is unknown.

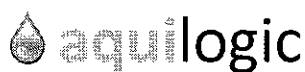
Little is known about the WSWs in the vicinity of the Getty Site, such as completion depth, screen interval(s), or pumping rates. In addition, the hydrogeologic and contaminant conditions in the bedrock have yet to be characterized.

Regardless of Dr. Desvousges' opinion that the groundwater beneath the West Windsor Getty Site is not a meaningful source of water supply, the defendant has an obligation to restore groundwater to its pre-discharge condition and is supported by the regulations, which define injury as *"any adverse change or impact of a discharge on a natural resource or impairment of a natural resource service, whether direct or indirect, long term or short term, and includes the partial or complete destruction or loss of the natural resource"*. Therefore, the plaintiffs are entitled to have the groundwater restored to its pre-discharge, non-injured state.

Further, under the New Jersey Spill Act (N.J.S.A. 58:10-23.11 et seq.), plaintiffs have the right to recover (amongst other things) *"cleanup and removal costs, damages (including primary and compensatory restoration damages and the costs of any natural resource damage assessments) and injunctive relief, for injury to, destruction of, or loss of natural resources."*

In addition, the policy to maintain the quality of the State's groundwater is also supported by the legislature's declaration in the New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq), which states, *"It is the policy of this State to restore, enhance and maintain the chemical, physical, and biological integrity of its waters, to protect public health, to safeguard fish and aquatic life and scenic and ecological values, and to enhance the domestic, municipal, recreational, industrial and other uses of water."*

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Rebuttal Report of Anthony Brown
To Expert Report of William H. Desvousges
March 2013

1.4.2. Service Loss Conclusions

1.5. Waldwick Trial Site

1.5.1. Assessment of Potential Service Losses

1.5.1.1. Potential Receptors

1.5.1.2. Public Water Supply

Statement

"PCE contamination makes groundwater near the site not potable at baseline. The two Waldwick municipal supply wells closest to the site (8 and 9) have PCE levels well above GWQS and are not producing..." (Desvousges, 2013: pg. 101).

Rebuttal to Statement

It is recognized that the groundwater may be contaminated with other chemicals (e.g. PCE). However, this does not negate the defendants' responsibility to address the contamination they released. The NJDEP is requiring that the defendants address their contamination and restore groundwater to its condition prior to the discharge of MTBE and/or TBA. Based upon site-specific conditions, the NJDEP may elect to pursue other parties that caused the contamination by other chemicals.

The NJDEP is requiring that the groundwater contamination be restored to its pre-discharge condition according to the New Jersey Spill Act (N.J.S.A. 58:10-23.11 et seq.), and to maintain the quality of the State's groundwater according to New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq).

1.5.2. Service Loss Conclusions

1.6. Ridgewood Trial Site

1.6.1. Assessment of Potential Service Losses

1.6.1.1. Potential Receptors

1.6.1.2. Public Water Supply

Statement

"The Ridgewood Water Department has been affected by PCE and TCE contamination. According to the 1990 Safe Water Drinking Act Impact Analysis for the Village of Ridgewood, 15 wells consistently had levels above the USEPA's MCLs for PCE" (Desvousges, 2013: pg. 104).

Rebuttal to Statement

It is recognized that the groundwater may be contaminated with other chemicals (e.g. PCE). However, this does not negate the defendants' responsibility to address the contamination they released. The NJDEP is requiring that the defendants address their contamination and restore groundwater to its

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To Expert Report of William H. Desvousges
March 2013

condition prior to the discharge of MTBE and/or TBA. Based upon site-specific conditions, the NJDEP may elect to pursue other parties that caused the contamination by other chemicals.

The NJDEP is requiring that the groundwater contamination be restored to its pre-discharge condition according to the New Jersey Spill Act (N.J.S.A. 58:10-23.11 et seq.), and to maintain the quality of the State's groundwater according to New Jersey Water Pollution Control Act (N.J.S.A. 58:10A-1 et seq).

1.6.2. Service Loss Conclusions

1.7. Bloomfield Trial Site

1.7.1. Assessment of Potential Service Losses

1.7.1.1. Potential Receptors

1.7.1.2. Public Water Supply

1.7.2. Service Loss Conclusions

1.8. References

EXHIBIT 11

**Excerpts of Testimony from Depositions of Anthony Brown taken
May 28 and June 3, 2013**

**Complete copies of deposition transcripts are available upon the
request of the Court**

Anthony Brown

Page 1

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

IN RE: METHYL TERTIARY BUTYL Master File
ETHER ("MTBE") No. 1:00-1898
 MDL 1358

This Document Relates to: (SAS): M21-88
New Jersey Department of
Environmental Protection,
et al., v. Atlantic Richfield
Co., et al.
No. 08 Civ. 00312

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TUESDAY, MAY 28, 2013
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Videotaped Deposition of ANTHONY BROWN,
Expert Witness, Volume I, held at the Law Offices of
Latham & Watkins LLP, 650 Town Center Drive,
Twenty-First Floor, Costa Mesa, California, beginning
at 9:10 a.m., before Sandra Bunch VanderPol, FAPR,
RMR, CRR, CSR #3032

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Deps@golkow.com

Anthony Brown

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1 Q. Do any of the employees of AquiLogic
2 hold the license as a certified tank installer in
3 New Jersey?

4 A. No.

5 Q. Do you hold the license as a
6 certified tank removal contractor in New Jersey?

7 A. No.

8 Q. Do any of the employees of AquiLogic
9 hold a license as a certified tank removal contractor
10 in New Jersey?

11 A. No.

12 Q. Do you have any license as an
13 underground investigator in New Jersey?

14 A. No, I do not.

15 Q. Do any of the employees at AquiLogic
16 hold the license as an underground investigator in
17 New Jersey?

18 A. No.

19 Q. With regard to your work on this
20 case, any of the individuals who you retained as
21 contractors to work with you, do any of them hold any
22 licenses in the State of New Jersey relating to their
23 professional work?

24 A. Not that I recall, no.

25 Q. Are you a Licensed Site Remediation

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1 Professional in New Jersey?

2 A. No, I'm not.

3 Q. Is there anyone working for AquiLogic
4 who is an LSRP in New Jersey?

5 A. No.

6 Q. Is there anyone working for AquiLogic
7 who's an LSP in Massachusetts?

8 A. I don't believe so.

9 Q. Is there anyone working for AquiLogic
10 who is an LEP in Connecticut?

11 A. I don't believe so.

12 Q. In the State of California, is there
13 any program for outsourcing regulation of site
14 remediation activities at underground storage tank
15 sites?

16 A. Not really, no. The State of
17 California did have a program where they attempted to
18 license professionals to operate in a manner similar
19 to an LSRP, and that program was referred to as the
20 REA-2 program. However, it was never fully
21 implemented. And, in fact, the program was dropped
22 last year.

23 Q. Do you hold a license as a
24 professional engineer in New Jersey?

25 A. No.

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IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

IN RE: METHYL TERTIARY BUTYL ETHER :
("MTBE") : Master File
: No. 1:00-1898
:
: MDL 1358 (SAS) M21-88
:
This Document Relates To: :
:
New Jersey Department of : VOLUME V
Environmental Protection et al. v. :
Atlantic Richfield Co., et al., : Pages 844 - 1032
Case No. 08-CIV-00312(SAS) :
:
:

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MONDAY, JUNE 3, 2013

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Videotaped Deposition of ANTHONY BROWN,
Expert Witness, Volume V, held at the Law Offices of
Latham & Watkins, 650 Town Center Drive, 21st Floor,
Costa Mesa, California, commencing at 8:44 a.m., on the
above date, before Kimberly S. Thrall, a Registered
Professional Reporter and Certified Shorthand Reporter.

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Anthony Brown

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1 A. While I have not seen the documentation
2 approving the shutdown, I am aware that the system was
3 shut down and removed from the facility.

4 Q. Okay. And you're aware that that was done with
5 the approval of the LSRP and DEP?

6 A. As I indicated, I -- I have not reviewed any
7 documentation showing that approval, but I had assumed,
8 given that it had been removed, that such approval had
9 been granted.

10 Q. Have you discussed that approval with anyone at
11 NJDEP?

12 A. I cannot say whether I discussed the approval.
13 I did discuss the fact that the on-site remediation
14 equipment had been removed from the site with the
15 caseworker, NJDEP.

16 Q. And what was his response?

17 A. It was a lady actually.

18 Q. And what was her response, sir?

19 A. Just that I believe she indicated they had been
20 doing on-site remediation for some time and -- and that
21 was about it --

22 Q. Did you make any attempt to discuss the
23 reproval -- the removal of the remediation equipment
24 with the LSRP?

25 A. No, I did not.

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1 Q. When did you learn of the approval?

2 A. As I indicated it, I have not learned
3 specifically of an approval. I had assumed that an
4 approval existed based on the fact the equipment had
5 been removed.

6 Q. And when did you learn that the equipment had
7 been removed?

8 A. Sometime in late 2012.

9 Q. Did you ask anyone at NJDEP or -- for copies of
10 documentation with regard to the approval?

11 A. No, I did not.

12 Q. Do you disagree with the approval having been
13 giving for -- given for the shutdown?

14 MR. MILLER: Objection. As asked, it assumes
15 the standard applies. It misstates the evidence.

16 THE WITNESS: Could you read the question back
17 for me, please.

18 (The following record was read by the reporter:

19 "Q. Do you disagree with the approval
20 having been given for the shutdown?")

21 THE WITNESS: With respect to that on-site
22 remediation system, no.

23 BY MR. KAMPMAN:

24 Q. Sir, the actions that you suggest for the
25 Ridgewood facility -- Shell facility at Ridgewood -- I'm

Anthony Brown

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1 MR. MILLER: Vague and ambiguous.

2 BY MR. KAMPMAN:

3 Q. So --

4 MR. MILLER: Are you talking about the current
5 work or the future work proposed by the witness?

6 MR. KAMPMAN: I'm talking --

7 MR. MILLER: It's not clear.

8 THE WITNESS: I was going to ask if you could
9 define what you mean by the "Ridgewood remediation
10 project."

11 BY MR. KAMPMAN:

12 Q. Sure. Work ongoing by Shell in response to
13 regulatory requirements of the -- or New Jersey
14 regulatory requirements.

15 A. No, I don't believe so.

16 Q. Okay. Has anyone indicated to you that the
17 LSRP's work at that Shell facility has been inadequate
18 or fails to meet remediation regulatory requirements?

19 MR. MILLER: Compound.

20 THE WITNESS: Not that I recall, no.

21 BY MR. KAMPMAN:

22 Q. Okay. How many times have you visited
23 Ridgewood?

24 A. Twice.

25 Q. And --

EXHIBIT 12

***NJDEP v. Union Carbide Corp.*, Docket No. MID-L-5632-07 (N.J.
Super. Ct. Mar. 29, 2011)**

FILED**MAR 29 2011**

Edward J. Ryan, J.S.C.

OPINION OF HON. EDWARD J. RYAN, J.S.C.
 SUPERIOR COURT OF NEW JERSEY
 LAW DIVISION: MIDDLESEX COUNTY
 P.O. BOX 964
 NEW BRUNSWICK, NJ 08903-0964

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION; THE COMMISSIONER OF THE NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION; AND THE ADMINISTRATOR OF THE NEW JERSEY SPILL COMPENSATION FUND, Plaintiff, v.	SUPERIOR COURT OF NEW JERSEY MIDDLESEX COUNTY, LAW DIVISION DOCKET NO.: MID-L-5632-07
UNION CARBIDE CORPORATION, Defendant.	CIVIL ACTION <u>OPINION OF THE COURT</u>

Argued On: October 12 to 26, 2010
Decided On: March 29, 2011

**A. Paul Stofa, Deputy Attorney General, for Plaintiff (Department of Law and Public Safety,
 Division of Law)**

**Alan E. Kraus, Kira Dabby, Kegan A. Brown, and Shawn M. LaTourette for Defendant
 (Latham & Watkins, LLP)**

Ryan, J.S.C.

Plaintiffs, as designated trustees of the natural resources of the State of New Jersey, have brought suit against the Union Carbide Corporation ("Defendant" or "UCC") to compel the expedited cleanup of contaminated groundwater underlying Defendant's former manufacturing site in Piscataway Township and Middlesex Borough, Middlesex County. Plaintiffs also seek natural resource damages under the New Jersey Spill Compensation and Control Act ("Spill Act"), N.J.S.A.

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58:10-23.11 to -23.24, to compensate the State for decades of groundwater contamination by hazardous chemicals used and manufactured at the site. The issues before the court are: (1) whether this court should order an expedited cleanup schedule to supersede the existing site remediation plan and agreement between Defendant and the New Jersey Department of Environmental Protection ("NJDEP"); and (2) whether Plaintiffs are entitled to compensation for interim damages to groundwater at Defendant's site, and, if so, in what amount.

FACTS

Defendant's Bound Brook property (the "Site") is located on River Road in Piscataway Township and Middlesex Borough. The site includes a manufacturing facility on approximately 274 acres (a large portion of which is vacant), and a 13 acre landfill on an adjacent property. Defendant acquired the site in the late 1930s from the Bakelite Corporation, an early innovator in plastics manufacturing that operated a plant on the site from about 1931. Defendant significantly expanded the facility in the following decades to produce phenolic resins, polystyrene, polyethylene, and formaldehyde. At its peak in the 1970s and '80s, thousands of workers were employed in manufacturing and research-and-design in more than 50 buildings and offices on the site. Defendant began winding down its manufacturing operations in the 1990s, and decommissioned the plant between 2002 and 2006. Today almost all of the manufacturing buildings have been demolished.

It is undisputed that Defendant's historical operations contaminated groundwater below the site. For many years UCC disposed of liquid operational wastes by direct discharge to unlined ditches, pits, and lagoons, and to an on-site sewer system that emptied into the Raritan River. Discharges also occurred through raw material storage practices and incidental spills around the property. Between 1940 and 1962, UCC disposed of solid wastes, including certain

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hazardous process wastes, in a landfill located on a narrow strip of property next to the River. These practices contaminated various portions of the plant site with hazardous wastes and byproducts from the manufacturing process, including phenols and volatile organic compounds ("VOCs"). UCC's records indicate that these disposal practices were discontinued over time, that the plant's sewer was connected to the municipal waste treatment system sometime in the late 1950s, and that the company adopted progressively stricter protocols for preventing and cleaning up accidental discharges.

In the early 1980s, UCC opened an investigation into contamination at the site. In 1987, UCC entered into an Administrative Consent Order with NJDEP's Site Remediation Program ("SRP") and assumed responsibility for remediation of contaminated soil and groundwater. The SRP oversees cleanups to ensure that parties responsible by law remediate contaminated sites to comply with health-based standards adopted by NJDEP. Various staff members at the SRP have been assigned to work with Defendant and assess Defendant's progress since the 1980s, including a site manager (currently Mark Souders) and a supervising geologist (Ann Pavelka since 1992). Mr. Souders and Ms. Pavelka, as representatives of the SRP called to testify in this case, explained that, within the NJDEP, the SRP has primary responsibility for review and approval of remedial activities occurring on the site.

UCC submitted two investigation reports in 1989 and 1991 analyzing the results of groundwater testing from monitoring wells around the property to determine the nature and extent of contamination. Using monitoring well data, UCC's environmental consultant derived isoconcentration maps for classes of contaminants at three depths below the site (referred to as the shallow, intermediate, and deep intervals). To create these maps, the consultant interpolated from discrete well readings to estimate contaminant levels across the site at each interval. On the basis of these investigations, UCC's consultant identified six Areas of Concern ("AOCs") that

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roughly correspond to regions on the maps where estimated concentrations exceeded ground water quality standards ("GWQS") in one or more contaminant class. These AOCs are not, however, representations of contaminant plumes. Areas within the AOC may, upon further investigation, prove to be clean. Instead, the AOCs show discrete regions of known or suspected contamination and serve to focus subsequent cleanup efforts.¹

After considering various remediation techniques, UCC settled on a pump-and-treat system to extract groundwater from recovery wells for treatment and discharge to the sewer. However, when engineers drilled test recovery wells in the shallow and intermediate intervals, the pumped rate of flow of groundwater was far below the 15 gallons per minute ("gpm") expected by UCC engineers. James Struck, an engineer who was involved with this project in the 1990s, testified that the wells produced at a rate of only 0.1 gpm, indicating that water moved "very slowly" through tiny pores and fissures in the bedrock. To speed recovery (and thereby shorten the site's remediation schedule), the engineers decided to mechanically increase flow in the areas of the recovery wells by hydraulically fracturing the bedrock. Short bursts of water under extremely high pressure were pumped into the recovery wells to expand natural fractures in the bedrock and thereby increase groundwater flow back into the recovery wells. This process artificially increases bedrock porosity² near the wells, but it does not increase the amount of groundwater under the site.

When UCC submitted its Remedy Selection Report to the SRP for approval of its pump-and-treat system in 1995, its consultant estimated bedrock porosity as 30% to account for the localized effects of hydraulic fracturing at the proposed recovery wells. This figure is

¹ The term 'Area of Concern' is defined in New Jersey's Technical Requirements for Site Remediation as "any existing or former distinct location where any hazardous substance, hazardous waste, or pollutant is known or suspected to have been discharged . . ." N.J.A.C. § 7:26E-1.8.

² Porosity is a measure of the amount of void space present in an aquifer available for water storage. Primary porosity is roughly analogous to density and describes the amount of void space between particles of 'solid' rock, whereas secondary porosity is a measure of void space created by fractures, fissures, and cracks in the bedrock. Total porosity—also called effective porosity—is the cumulative measure.

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significantly higher than other porosity estimates for Brunswick shale bedrock in the Newark Basin that underlies the site. In 1999 the United States Geologic Survey ("USGS") published the results of a tracer test in the Brunswick formation at the same relative depth of study as the conditions at Defendant's site. USGS determined the effective porosity of the shale to be between 0.037% and 0.14%. Mr. Struck testified that the 30% figure used in the Remedy Selection Report does not reflect the natural porosity of the bedrock, and that this number should not be used to calculate the amount of groundwater naturally occurring in the shallow and intermediate intervals, which is, in his words, "very small." In the remedy design approved by SRP, recovery wells were situated to ensure that the radius of influence of the fracturing from the wells would blanket areas of highest concentration indicated by groundwater monitoring.

The system was installed and began pumping in 1997. UCC's design placed 35 wells at shallow and intermediate intervals distributed between the six AOCs. UCC concluded that deep wells were not warranted because its 1989 and 1991 studies indicated minimal contamination levels in the deep interval. SRP reviewed and approved the design of the system, including the number, location, and depth of the recovery wells. Plaintiff's remediation expert, Gaynor Dawson, acknowledged that the system has been successful at containing the contaminant plumes and has reduced contaminant concentrations based on available monitoring data.

UCC has also completed two rounds of soil excavations to remove lingering sources of contamination that threaten to leach into the groundwater. Between 1997 and 1999, the company removed approximately 28,000 tons from the site. After the site was decommissioned and many manufacturing buildings demolished, UCC excavated another 26,100 tons between 2007 and 2009.

Defendant also applied to the SRP for a Classification Exception Area ("CEA") designation in 2001. The application identified areas where groundwater contamination

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exceeded water quality standards, and designated the entire site as a CEA to ensure that groundwater would not be used for drinking water. UCC projected that remediation of groundwater to GWQS levels would be complete by 2024, and committed to regular groundwater sampling to monitor progress. The SRP approved the application in 2002, accepting UCC's projected end date, and acknowledging that there are no drinking wells tapping the contaminated aquifer and that no uses have been proposed. As of the time of this trial, remediation efforts are continuing at the site according to the means and schedule approved by the SRP.

DISCUSSION

The main issue in this case is whether Plaintiffs are entitled to primary and compensatory restoration damages under the New Jersey Spill Act. Primary restoration is the remedial action that returns the natural resources to pre-discharge conditions and compensatory restoration is compensation for the natural resource services lost from the beginning of the injury through to the full recovery of the resource. Plaintiff also brings public nuisance and trespass tort claims against Defendant for invasion of a natural resource in the public trust.

Primary Restoration Damages

Plaintiff asks the court to compel Defendant to restore groundwater to predischage conditions in the shortest amount of time possible. Plaintiffs' remediation expert, Mr. Dawson, estimates that the current pump-and-treat system will require an additional 30 to 36 years to return groundwater under the site to pre-discharge conditions, measured by the lowest technologically detectable amount of any discovered contaminant. According to the testimony of the SRP's site manager at Defendant's property, Mr. Souders, this is not the standard that the SRP requires, nor is it the standard that Defendant relied upon when projecting the completion of its remedial responsibilities in 2024. Defendant argues that it will have met the requirements of

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the law by cleaning the groundwater to GWQS, which tolerate measurable concentrations of many chemicals at levels that do not affect health or safety.

Plaintiffs are not satisfied with this approach, nor do they believe that an additional 20 to 30 years is an appropriate timeframe to complete the cleanup. To that end, Mr. Dawson opined that drilling 24 additional pumping wells in the shallow and intermediate intervals would achieve the cleanup in only 8 to 9 years from now, at an added cost to Defendant of approximately \$500,000. Defendants argue that Plaintiffs have no authority to order UCC to implement additional remediation measures when the existing plan was reviewed and approved, and is currently supervised, by NJDEP's own Site Remediation Program. Further, Defendant contends that there is no statutory or regulatory basis for Plaintiff's position that cleanup must be completed in the shortest time possible.

This Court finds that Plaintiffs have not shown why they are entitled to expedited primary restoration. Defendants are currently remediating the property to the satisfaction of the SRP and Plaintiffs have not cited any authority as to why restoration must be completed in a shorter time frame. Plaintiffs failed to show that the groundwater, in its current state, poses any risk to human health or environmental safety that would justify an expedited cleanup. The Defendant has been working closely with the SRP and has been in full compliance with the requests of the SRP. This Court finds no basis to intervene when a division of the NJDEP has stated that it has no objection to the current primary restoration plan. Therefore, Plaintiff's claim for primary restoration damages is denied.

Compensatory Natural Resource Damages

Plaintiffs also seek compensatory natural resource damages for the period in which groundwater at the site has been, and will continue to be, contaminated until the primary restoration is complete. Plaintiffs have determined that the appropriate means of compensation

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is to ensure that a comparable volume of groundwater is protected from contamination in perpetuity, for which Plaintiffs seek monetary damages for the permanent protection of 200 undeveloped acres as open space. Plaintiffs' expert in hydrogeology, Gary Hokkanen, estimated the total volume of contaminated groundwater at the site from the time that UCC acquired the property. Relying on Mr. Hokkanen's volume calculations, as well as land value estimates compiled by a local appraiser, Plaintiff's natural resource damages expert, David Chapman, has assessed damages of \$31.3 million.

The parties in this case do not dispute the central importance of services to the valuation of resource damages. But they do disagree about how lost services should be accounted for in defining an appropriate remedy and assessing monetary damages. Defendant insists that lost services must be directly identified and quantified to seek damages for an injury to groundwater. Plaintiffs argue that trustees need not measure lost services directly; that damages can be estimated as the cost of in-kind restoration projects. Mr. Chapman explained his understanding that any injury to a natural resource, by definition, changes the services that that resource provides, and so it is impossible to injure a natural resource without somehow affecting the services it provides. So long as the trustee has an accurate measure of the scope of the injury, a restoration project that fully replaces the injured resource will restore services that have been compromised. Plaintiffs argue that direct replacement of the resource in an equivalent setting obviates the need for quantification of lost services.

Mr. Chapman and Defendant's economic expert, Dr. William Desvousges, disagreed about whether Mr. Chapman's method of assessment without quantifying services—called a Resource Equivalency Analysis ("REA")—is appropriate to estimate damages for injuries to groundwater. Mr. Chapman acknowledged that REA is generally used for assessing damages to wildlife, specifically birds and fish, and not for groundwater injuries. However, Plaintiffs argue

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that NJDEP is entitled to deference in its interpretation and implementation of the provisions of the New Jersey Spill Act, including Plaintiffs' choice of remedy, although the agency has not formally adopted any rule or regulation concerning the calculation of natural resource damages. While federal regulations promulgated by the Department of the Interior and the National Oceanic and Atmospheric Administration both require trustees to identify and quantify lost services to establish damages under federal law, Plaintiffs argue that federal regulations are not binding here and do not limit the NJDEP's implementation of the state Spill Act.

This Court finds that the Plaintiffs failed to adequately identify a loss for which the public must be compensated. Mr. Chapman's use of REA in the context of groundwater is not supported by the testimony at trial or the prior uses of such an analysis. Even the Plaintiffs concede that REA is typically used in the context of wildlife, where it is almost impossible to quantify lost services. Groundwater is not such a resource that does not lend itself quantification. Plaintiffs merely failed to provide any real proof of those lost services that Plaintiffs assume to be present. The Plaintiffs claim they need not prove lost services to recover compensatory restoration damages. However, even assuming that is true, the Plaintiffs' calculation of the damages is far from irrefutable.

Mr. Chapman broke the REA into three steps: (1) quantify the interim injury by asking how much groundwater was contaminated and for how long; (2) determine whether a restoration project could properly offset the injury and how much restoration would be required; and (3) calculate the cost of implementing the project to assess damages.

To estimate the interim injury, Mr. Chapman relied on Mr. Hokkanen's calculations of the total volume of contaminated groundwater at the site through time. Combining calculations of past and future contamination, Mr. Chapman applied a three percent discount factor to inflate past volumes (and discount future volumes) to present value in Discounted Gallon Years

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("DGY") for base year 2010.³ The total injury to groundwater—called a 'debit'—was calculated as 1.906 billion DGY between 1940 and 2018, the earliest date that primary restoration would be complete under Mr. Dawson's plan.

Mr. Chapman admitted that, if Mr. Hokkanen's calculations were wrong—concerning either the starting dates of the contamination or the total volume of groundwater, or both—then Mr. Chapman's calculation of compensatory damages is necessarily flawed. Defendant's hydrogeologist Scott MacDonald testified that Mr. Hokkanen's groundwater volume calculations are "vastly overstated" for many reasons, the most significant of which is his mistake about the porosity of the bedrock at the site. Mr. Hokkanen relied on a porosity value of 30%, although a USGS test in 1999 determined the effective porosity within the Brunswick Formation to be approximately 0.037% to 0.14%. Mr. MacDonald and Mr. Struck both testified that well yields and performance at the site, even after hydraulic fracturing of the recovery wells, indicate that there is far less water under the site than estimated, and that the porosity is a fraction of what Mr. Hokkanen estimated. This mistake alone could reduce Mr. Hokkanen's calculations of 1.9 billion gallons of contaminated groundwater to less than 20 million gallons.

Mr. Chapman's second step was to fashion a 'credit' to offset the injury debit of 1.9 billion DGY calculated in the first step. To offset injuries to groundwater, Mr. Chapman and Mr. Sacco both testified that the NJDEP favors aquifer protection through open space purchases funded by the responsible party. By purchasing private land before it is developed and protecting it in its natural condition, the NJDEP ensures that the underlying groundwater remains pristine. To determine the offset acreage, Mr. Chapman assumes that there will be the same

³ Discounting makes past and future costs comparable by converting them into present-day values. Users value consumption in the past more heavily than consumption in the present, so past consumption should be inflated, and future consumption discounted, to estimate the present value. For this reason, loss of groundwater in the past cannot be fairly compensated by replacing or restoring an equal volume today. In Chapman's words: "[I]f we contaminated a gallon of groundwater in 1940 and we're going to compensate by giving groundwater in 2010, just giving a gallon for gallon doesn't account for that time difference. . . . [A] loss in the past has be compensated for by additional amounts this year"

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volume of groundwater per acre below properties overlying the same or similar aquifer system as Defendant's site. Relying on Mr. Hokkanen's porosity estimates and groundwater volume calculations, Chapman projected that each equivalent acre purchased by the DEP will protect 0.95 billion DGY in perpetuity. Dividing this per-acre figure into the total 1.9 billion DGY debit, Mr. Chapman concluded that the restoration project must permanently protect 200 acres to offset the injury.

However, the restoration proposed in this case amounts to a windfall to Plaintiffs because Mr. Chapman made no adjustment for the different types and quality of services provided by the lost resource (groundwater) and the proposed restoration project (permanent land preservation). Undeveloped land provides services over and above protection of groundwater quality that are not accounted for in Mr. Chapman's analysis. For instance, open space is used and enjoyed by the public for recreation, and it provides wildlife habitat: examples of services that are not supported by groundwater, and were never at issue in this case. Nevertheless, Plaintiffs propose to charge Defendant for the costs of these additional services as part of the price of protecting 200 acres of land.

Finally, Mr. Chapman estimated the cost of implementing this project to assess damages in this case. Mr. Chapman requested a statistical summary of prices for recent sales of undeveloped properties zoned for residential, commercial, or industrial use—in other words, land uses that could potentially lead to contamination of the underlying groundwater if developed. Mr. Chapman relied on a spreadsheet of recent sales prepared in December 2009 by Joseph Baldoni, of Appraisal Associates Inc. At Mr. Chapman's request, Mr. Baldoni compiled a list of 80 undeveloped properties between five and one hundred acres in size within 20 miles of Middlesex Borough. From this survey of transactions, Mr. Chapman omitted high-side "outliers," properties that sold for far more per acre than the average for all the properties in each

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use class. Mr. Chapman averaged the sale price for all properties larger than 20 acres, omitting smaller properties to account for the likelihood that small properties will have a higher per-acre price. He multiplied the average per-acre price of \$156,500 by 200 acres to determine resource damages of \$31.3 million.

Clearly, there are problems with the Plaintiffs' analysis here. First and foremost, the NJDEP asks the Court to defer to its judgment to use REA instead of quantifying damages through lost services when it, itself, has never declared such an analysis to be appropriate. The federal regulations require quantification of lost services. NJDEP may elect a different theory or practice, but it cannot do so on a whim. There was no evidence presented at trial that REA is the recommendation or practice of the NJDEP. Notwithstanding that fact, the Plaintiffs have failed to adequately substantiate its calculations. For the most part, the Plaintiffs relied on Defendant's internal numbers, which representatives of the Defendant testified to be substantially conservative. Moreover, the porosity values used by the Plaintiffs lack credibility and the Plaintiffs' projected cost of implementing the project was convincingly refuted by the Defendant. Overall, the Plaintiffs failed to set forth a comprehensive calculation of compensatory restoration damages that the Court can endorse. Therefore, Plaintiffs' claim for compensatory natural resource damages is denied.

Public Nuisance and Trespass

"The tort of public nuisance fundamentally involves the vindication of a right common to the public." In re Lead Paint Litigation, 191 N.J. 405, 425 (2007).

A public nuisance is an unreasonable interference with a right common to the general public. Circumstances that may sustain a holding that an interference with a public right is unreasonable include the following (a) whether the conduct involves a significant interference with the public health, the public safety, the public peace, the public comfort or the public convenience, or (b) whether the conduct is proscribed by a statute, ordinance or administrative regulation, or (c) whether the conduct is of a continuing nature or has produced a permanent or

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long-lasting effect, and, as the actor knows or has reason to know, has a significant effect upon the public right.

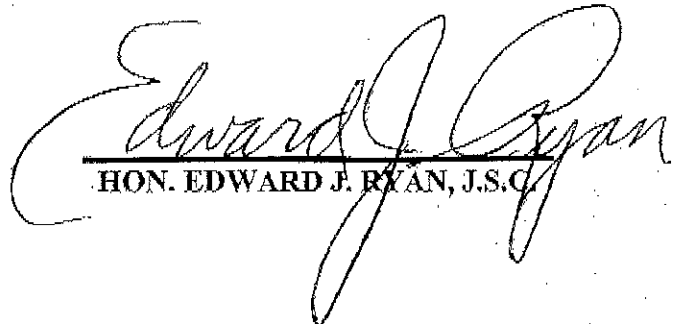
Id. "[A]ny actual invasion that was the direct result of the defendant's act and that interfered with the plaintiff's exclusive possession of his land constituted an actionable trespass, even in the absence of fault." N.J. Dep't of Env'tl. Prot. v. Ventron Corp., 94 N.J. 473, 488-89 (1983).

In this case, the Plaintiffs have not satisfied their burden by showing that the contamination of the groundwater interfered with the general public's use of groundwater or that the discharges physically interfered with the public's use and enjoyment of the State's groundwater resource. The groundwater in question is under private property and has never been available to the public. Plaintiffs have not shown how the public has been deprived of anything. Therefore, Plaintiffs' claims for public nuisance and trespass must fail.

CONCLUSION

In sum, this Court finds that the Plaintiffs failed to meet their burden to obtain an award of primary restoration or compensatory restoration damages. This Court further finds that Plaintiffs' claims for public nuisance and trespass must fail. Therefore, this Court finds in favor of the Defendant and the Plaintiffs' Complaint is dismissed with prejudice.

So Ordered.


HON. EDWARD J. RYAN, J.S.C.